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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/172,553

10/14/98

GREEN

J

2914.IUS

EXAMINER

MMC2/0406

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ART UNIT

PAPER NUMBER

2815

DATE MAILED:

04/06/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

**BEST AVAILABLE COPY**

<p align="center"><b>Office Action Summary</b></p>	<p><b>Application No.</b> 09/172,553</p>	<p><b>Applicant(s)</b> GREEN ET AL.</p>	
	<p><b>Examiner</b> José R. Díaz</p>	<p><b>Art Unit</b> 2815</p>	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 January 2001 and 4 October 2000.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 31-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

- |   |  |
|---|--|
| 15) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

This Office Action is in response to amendments filed on October 4, 2000 and January 16, 2001 on which Applicant amended claims 16-19, 21-24, 26-29, 31 and 33; cancelled claims 16-30; and added claims 35-45.

#### ***Election/Restrictions***

➤ Applicant's election without traverse of Group II (claims 31-41) in Paper No. 9 is acknowledged.

#### ***Claim Objections***

➤ Applicant is advised that should claims 31 and 32 be found allowable, claims 33 and 34 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Furthermore, claim 45 will be objected to under 37 CFR 1.75 as being a substantial duplicate of claim 44. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

#### ***Claim Rejections - 35 USC § 102***

➤ The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

➤ Claims 31-34 and 38-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Park (US Patent No. 5,457,063).

Regarding claim 31, Park teaches a semiconductor capacitor storage poly (22) including downwardly extending recesses formed therein (See Figure 3C), said recesses comprising a plurality of contiguous mesas forming a maze-like structure (See Figure 4).

Regarding claim 32, Park teaches that said mesas extend in the X, Y and Z coordinates (See Figure 4).

Regarding claim 33, Park teaches a semiconductor capacitor storage poly (22) including downwardly extending recesses formed therein (See Figure 3C), said recesses comprising a plurality of contiguous webs forming a maze-like structure (See Figure 4).

Regarding claim 34, Park teaches that said webs extend in the X, Y and Z coordinates (See Figure 4).

Regarding claim 38, Park teaches a semiconductor memory cell structure (See col. 1-6), comprising: a storage poly structure (22) (See Figure 3D); a plurality of recesses extending into said storage poly structure (See Figures 3C and 3D); and dielectric layer (24) substantially coating an upper surface of said storage poly structure and substantially lining each of said plurality of recesses (See Figure 3D).

Regarding claim 39, Park teaches a cell poly structure (26) over said dielectric layer (See Figure 3D).

Regarding claim 40, Park teaches that the storage poly structure (22) has a web-like structure (See Figure 3C and 4).

Regarding claim 41, Park teaches that at least some of said plurality of recesses extend into said storage poly structure (22) (See Figure 3C, 3D, and 4).

➤ Claims 37 and 44-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al. (US Patent No. 5,723,373).

Regarding claims 37 and 44-45, Chang et al. teach an intermediate semiconductor memory cell structure (See col. 1-8), comprising: a storage poly structure (10) with recesses (14) formed therein (See Figure 4); a hemispherical-grain polysilicon layer (12) on said storage poly structure (See Figure 4); and dielectric material (16) at least lining the recesses (See Figure 4).

➤ Claim 42 is rejected under 35 U.S.C. 102(e) as being anticipated by Wu (US Patent No. 5,814,549).

Regarding claim 42, Wu teaches an intermediate semiconductor capacitor structure (See columns 1-8), comprising: a storage poly structure (26) (See Figure 7); a hemispherical-grain polysilicon layer (28) on said storage poly structure (See Figure 7); and a mask (30) positioned over the hemispherical-grain polysilicon layer (See Figure 6), elevated portions of the hemispherical-grain polysilicon layer being exposed through said mask (See Figure 7).

#### ***Claim Rejections - 35 USC § 103***

➤ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

➤ This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

➤ Claims 35-36 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn et al. (US Patent No. 5,358,888) in view of Wu (US Patent No. 5,814,549).

Regarding claims 35 and 43, Ahn et al. teach an intermediate semiconductor capacitor structure (See columns 1-12), comprising: a storage poly structure (40b) with recesses (See openings formed in said layer 40) formed therein (See Figure 13); and a hemispherical-grain polysilicon layer (80) over said storage poly structure (See Figure 13).

However, Ahn et al. do not teach a mask over said hemispherical-grain polysilicon layer. Wu teaches that it is well known to include a mask (30) over said hemispherical-grain polysilicon layer (28), wherein portions of said hemispherical-grain polysilicon layer being exposed through said mask (See Figure 7). Wu provides

motivation to use such a mask in that it provides a better topography of planarization (See col. 4, lines 35-37). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to have modified Ahn et al. to include a mask over said hemispherical-grain polysilicon layer as taught by Wu since such modification would result in a layer that provides a better topography of planarization, as described in col. 4, lines 35-37 of Wu.

Furthermore, Ahn et al. fails to teach an intermediate semiconductor capacitor structure wherein said recesses communicate with exposed regions of said hemispherical-grain polysilicon layer. Regarding claim 36, Wu teaches that it is well known in the art to form recesses in layer 26 (See Figure 8) by removing the exposed regions of the hemispherical-grain polysilicon layer 28 (See Figure 7), which are in direct "communication" to (i.e. over) regions wherein said recesses are formed (See Figures 7-8). Wu provides motivation to form such an intermediate semiconductor capacitor structure in that it provides capacitors having enlarged surface area (See col. 5, lines 11-16). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to have modified Ahn et al. to include an intermediate semiconductor capacitor structure wherein said recesses communicate with exposed regions of said hemispherical-grain polysilicon layer as taught by Wu since such modification would result in an enlarged surface area layer, as described in col. 5, lines 11-16 of Wu.

***Response to Arguments***

➤ Applicant's arguments with respect to claims 31-45 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

➤ Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 8:00 - 5:00 Monday through Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers



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for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD  
April 4, 2001

A handwritten signature in black ink, appearing to read 'Eddie Lee', is positioned above the printed name and title.

**EDDIE LEE**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**